

## Claims

[c1] A flat panel radiator assembly comprising:  
a frame including a horizontal portion and a vertical portion;  
a flat panel radiator disposed within the frame and having a front surface and a back surface;  
an acoustic transducer for inducing motion in the flat panel radiator to reproduce an audio signal;  
a support structure attached to the vertical portion of the frame and providing a mounting surface for the acoustic transducer;  
a first isolation element interposed between the flat panel radiator and the horizontal portion of the frame to isolate the flat panel radiator from the frame; and  
a second isolation adjacent to the first isolation element for enabling the flat panel radiator to vibrate and move laterally in response to motion induced by the acoustic transducer.

[c2] The flat panel radiator assembly of claim 1 wherein the support structure spans the flat panel radiator on the back surface of the radiator.

[c3] The flat panel radiator assembly of claim 1 wherein the support structure supports the entire weight of the acoustic transducer.

[c4] The flat panel radiator assembly of claim 1 further comprising a contact pad inserted between the back surface of the flat panel radiator and the transducer.

[c5] The flat panel radiator assembly of claim 4 wherein the contact pad is adhesively fastened to both the flat panel radiator and the transducer.

[c6] The flat panel radiator assembly of claim 5 wherein the contact pad fully covers a bottom ring of the transducer.

[c7] The flat panel radiator assembly of claim 1 further comprising a third isolation element interposed between the support structure and the vertical portion of the frame.

[c8] The flat panel radiator assembly of claim 1 wherein the second isolation

element adheres to the adjacent first isolation element.

[c9] The flat panel radiator assembly of claim 1 wherein the flat panel radiator is positioned in the second isolation element and held in place by friction between the radiator and the second isolation element.

[c10] The flat panel radiator assembly of claim 9 wherein the flat panel radiator slides laterally inside the second isolation element in response to a low frequency audio signal.

[c11] The flat panel radiator assembly of claim 9 wherein the flat panel radiator vibrates inside the second isolation element in response to a high frequency audio signal.

[c12] The flat panel radiator assembly of claim 1 further comprising a scrim attached to the horizontal portion of the frame to provide a decorative cover for the flat panel radiator.

[c13] The flat panel radiator assembly of claim 1 wherein the flat panel radiator provides a flat frequency response over an audible range of frequencies from approximately 50 Hz to 16 KHz.

[c14] The flat panel radiator assembly of claim 13 wherein the flat panel radiator has a sensitivity of approximately 84 dB.

[c15] The flat panel radiator assembly of claim 1 further comprising a voice coil and a magnet mounted within the support structure.

[c16] The flat panel radiator assembly of claim 1 wherein the flat panel radiator comprises a core that is covered by facings on each of the front and back surfaces.

[c17] The flat panel radiator assembly of claim 16 wherein the core is fabricated from Kraft paper.

[c18] The flat panel radiator assembly of claim 16 wherein the facings are fabricated from an aramid polyamide material.

[c19] A flat panel radiator assembly comprising:

- a frame including a horizontal portion and a vertical portion;
- a flat panel radiator disposed within the frame and having a front surface and a back surface;
- an acoustic transducer for inducing vibrational motion in the flat panel radiator to reproduce an audio signal;
- a support structure attached to the vertical portion of the frame and providing a mounting surface for the acoustic transducer;
- an isolation element interposed between the flat panel radiator and the horizontal portion of the frame to isolate the flat panel radiator from the frame; and
- a plurality of stabilizers disposed between the flat panel radiator and the support structure.

[c20] The flat panel radiator of claim 19 wherein the support structure spans the flat panel radiator on the back surface of the radiator.

[c21] The flat panel radiator assembly of claim 19 wherein the support structure supports the entire weight of the acoustic transducer.

[c22] The flat panel radiator assembly of claim 19 further comprising an additional isolation element interposed between the support structure and the vertical portion of the frame.

[c23] The flat panel radiator assembly of claim 19 wherein the flat panel radiator assembly is installed in a suspended ceiling grid system.

[c24] The flat panel radiator assembly of claim 19 wherein the flat panel radiator assembly is installed in a wall partition with the front panel of the radiator facing into an enclosed space.

[c25] The flat panel radiator assembly of claim 19 wherein the flat panel radiator assembly is a standalone apparatus.

[c26] The flat panel radiator assembly of claim 19 wherein the flat panel radiator vibrates inside the isolation element in response to an audio signal.

[c27] The flat panel radiator assembly of claim 19 further comprising a scrim attached to the horizontal portion of the frame to provide a decorative cover for the flat panel radiator.

[c28] The flat panel radiator assembly of claim 19 wherein the flat panel radiator provides a frequency response over an audible range of frequencies from approximately 200 Hz to 5 KHz.

[c29] The flat panel radiator assembly of claim 28 wherein the flat panel radiator has a sensitivity of approximately 80 dB.

[c30] The flat panel radiator assembly of claim 19 further comprising a voice coil and a magnet mounted within the support structure.

[c31] The flat panel radiator assembly of claim 19 wherein the flat panel radiator comprises a polypropylene material.

[c32] A flat panel radiator assembly comprising:  
a frame;  
a flat panel radiator disposed within the frame;  
an electromechanical transducer for inducing motion in the flat panel radiator to reproduce an audio signal supplied to the transducer;  
a bridge attached to the frame and providing a mounting surface for the electromechanical transducer; and  
an isolation element for supporting and isolating the flat panel radiator from the frame thereby enabling the flat panel radiator to vibrate and to slide laterally in response to motion induced by the audio signal supplied to the electromechanical transducer.

[c33] The flat panel radiator assembly of claim 32 wherein the flat panel radiator assembly is installed in a suspended ceiling grid system.

[c34] The flat panel radiator assembly of claim 32 wherein the flat panel radiator assembly is installed in a wall partition with the front panel of the radiator facing into an enclosed space.

[c35] The flat panel radiator assembly of claim 32 wherein the flat panel radiator

assembly is a standalone apparatus.

- [c36] The flat panel radiator of claim 32 wherein the bridge spans a length of the flat panel radiator on a back surface of the radiator and provides the sole support for the transducer.
- [c37] The flat panel radiator of claim 32 further comprising a contact pad inserted between, and adhesively fastened to, the flat panel radiator and transducer.
- [c38] The flat panel radiator of claim 32 further comprising an additional isolation element that is positioned between the bridge and the frame.
- [c39] The flat panel radiator of claim 32 wherein the flat panel radiator slides laterally within the isolation element in response to a low frequency audio signal supplied to the transducer.
- [c40] The flat panel radiator of claim 32 wherein the flat panel radiator vibrates in response to mid-range and high frequency audio signals supplied to the transducer.
- [c41] The flat panel radiator of claim 32 wherein the flat panel radiator provides a relatively uniform frequency response to audio signals in the range from approximately 50 Hz to approximately 16 Khz.
- [c42] The flat panel radiator assembly of claim 41 wherein the flat panel radiator has a sensitivity of approximately 84 dB.
- [c43] The flat panel radiator assembly of claim 32 further comprising a voice coil and a magnet mounted within the bridge.
- [c44] The flat panel radiator assembly of claim 32 wherein the isolation element comprises two sections.
- [c45] The flat panel radiator assembly of claim 44 wherein a first section of the isolation element isolates the flat panel radiator from the frame.
- [c46] The flat panel radiator assembly of claim 45 wherein a second section of the isolation element is a butt joint adjacent to the first section and providing

**support for the flat panel radiator when vibrational and lateral movements are induced in the radiator by the transducer.**